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SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

XXI.—DESCRIPTIONS OF APODAL FISHES FROM THE TROPICAL PACIFIC.

BY

CHARLES H. GILBERT,
Professor of Zoology, Indiana University.

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SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S. FISH COMMISSION STEAMER ALBATROSS.

No. XXI.—DESCRIPTIONS OF APODAL FISHES FROM THE TROPICAL PACIFIC.

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The interesting assemblage of eels here reported upon was obtained, with one exception, in 1888 during the investigations of the *Albatross* in the region around Panama and the Galapagos Islands. *Ophisoma macrurum* was obtained the following year in the Gulf of California, and it is here included because of its close relationship to some of the forms discussed.

Chlopsis equatorialis, sp. nov.

Body extremely slender, little compressed, tapering posteriorly to a very narrow tail, which is, however, not filamentous. Depth about one-fortieth of the total length.

Head long and slender, somewhat as in Nettastoma, the lower jaw shorter than the upper, the eye nearly over the angle of mouth.

Posterior nostril a long horizontal slit immediately in front of the lower margin of eye. Anterior nostril minute, subtubular, near tip of snout. Eye $3\frac{1}{2}$ in snout.

Snout very soft. A series of slit-like mucous pores along margin of upper jaw, and a series of round pores along lower jaw. A transverse series on occiput connecting the lateral lines.

Gape $2\frac{3}{5}$ in head. Maxillaries slender, extending well forwards, abutting against the vomer immediately behind its head. Both jaws and vomer with wide bands of short sharp conical teeth, the inner series in the jaws slightly longer than the others. Band on shaft of vomer reaching back to front of posterior nostril.

Branchiostegal rays long and much bowed, curving around behind and above the opercles.

Gill openings with their margins much curved, forming four-fifths of a circle. Their vertical diameter nearly equals that of eye, and is more than twice the length of the interspace separating them below. Tongue apparently undeveloped.

Head $2\frac{2}{3}$ in body (head and trunk); the body $3\frac{1}{4}$ in tail.

Dorsal beginning behind the head at a distance equaling one fourth the length of head.

Color dusky-olive, dotted with coarse brown specks everywhere except on under side of head and on fins. A blackish streak on median line of belly. Fins translucent.

This species has not the appearance of a deep-sea eel, though the intestine is protruded through the anus in the type specimen, as the result of the release of pressure. A single specimen $14\frac{1}{2}$ inches long, said to have been taken at Station 2792, off the coast of Ecuador, in 401 fathoms.

Xenomystax gen. nov. (**Muræsocidæ.**)

Scaleless. Pectorals well developed. Vertical fins large, continuous around the tail, the rays evident. Dorsal beginning before base of pectorals.

Gill slits vertical and rather wide, the gill membranes continuous below the throat.

Branchiostegals apparently eleven or twelve in number, long and much curved, continuing around the posterior and upper edges of opercles. Mouth with wide lateral cleft, not extending far beyond the eye. Maxillary very wide, not extended far forwards, the clasping processes applied to shaft of vomer well behind its head.

Teeth all conical, slender, and sharp, mostly depressible, those in jaws in wide bands. Maxillary with a deep lengthwise groove, running the entire length of bone and dividing the band of teeth into two portions. Lower jaw much shorter than the upper.

Posterior nostril a linear slit, midway between eye and tip of snout; the anterior in a short tube just behind the head of vomer. Tongue, small, with the tip free. Lips undeveloped. Lateral line conspicuous.

A deep-water form, with thin skin and black coloration, most nearly related to *Muræsox*, but differing in the peculiar structure of the jaws and in the dentition.

(Type, *Xenomystax atrarius* sp. nov.)

Xenomystax atrarius, sp. nov.

Snout very long and slender, the gape wide; end of maxillary equidistant from tip of mandible and gill opening. Front of orbit over the beginning of last third of length of gape. A series of long slit-like mucous pores along margin of upper jaw; a conspicuous series on mandible and preopercle.

Teeth in jaws in wide bands, mostly depressible, the outer series of teeth laterally shortest and not meeting in closed mouth. The maxillary teeth divided by a deep groove running entire length of jaw, those on inner side of groove long, close set, rigid, in a single series. Mandible with a much narrower and shallower groove, on the inner edge of which is a single series of very small conical teeth, directed

inwards. Tip of mandible enlarged to form a knob which fits into a toothless depression just behind head of vomer, the vomer extending well beyond the tip of lower jaw. Teeth on head of vomer and knob of mandible similar, slightly larger than those on sides of jaw. Anterior part of shaft of vomer (immediately behind depression for tip of mandible) with a median series of strong conical teeth, the largest in the mouth. These are usually accompanied by smaller lateral series, and followed by a narrow band of very small conical teeth which reach backwards to middle of mouth.

Length of head equal to that of trunk, and one-third that of tail. Posterior line of occiput midway between front of dorsal and middle of eye.

Gill openings broadly lunate, the upper margin continued as a membranous fold across base of pectorals. The vertical length of the slit is one-third of the snout, and the two are separated by an interspace two thirds the length of the slit.

Pectorals narrow, one-half snout.

Color very dark brown, the fins black, the pores of the lateral line white.

A single specimen, $18\frac{3}{4}$ inches long, from Station 2792, in 401 fathoms.

OPHISOMA SWAINSON.

KEY TO THE SPECIES OF OPHISOMA.

a. Vent submedian, the body and tail about equal in length. Upper jaw but little projecting, lips thin.....BALEARICUM

aa. Vent anterior in position, the tail much longer than the body.

b. Snout short and broadly rounded, but little projecting beyond tip of mandible. Tail nearly twice length of body.....MACRURUM, sp. nov.

bb. Snout long and acute, projecting well beyond tip of mandible.

c. Tail less than twice length of body.

d. Eye large, equaling snout, 5 in head.....MYSTAX

dd. Eye small, one-half snout, 8 in head.....PRORIGERUM, sp. nov.

cc. Tail much more than twice length of body.....NITENS

Ophisoma balearicum? Delaroche.

Four immature specimens from the Bay of Panama, taken at a depth of 33 fathoms (Station 2797), are provisionally referred to this species. They agree perfectly with the descriptions of *O. compressum* Poey and *O. mellissii* Günther, and show in addition a brownish-black blotch below the eye not noted in descriptions of other species. From the current descriptions of *O. balearicum* they differ in the larger mouth, the maxillary reaching to below the middle of the eye. It is probable, however, that adults of all the species of *Ophisoma* agree in this respect. Direct comparison of specimens from the Mediterranean with those from the West Indies and from the tropical Pacific may show them to be specifically distinct, but it seems more advisable for the present to consider *balearicum* a widely distributed form agreeing in

this respect with its near ally, *Leptocephalus conger*. *Ophisoma anago* may also be properly referred to this species.

The specimen from Cape St. Lucas, catalogued by Jordan and Gilbert as *Leptocephalus conger* (Procs. U. S. National Museum, 1882, 378), has been reëxamined by me and found to belong to this species. *L. conger* is therefore as yet unknown from our Pacific coast.

The following is a detailed description of the Pacific specimens:

Cleft of mouth scarcely reaching to below middle of eye, $3\frac{1}{2}$ in head. Lower jaw shorter than the upper, but less so than in related species; the lips thin, and the upper not forming a projecting proboscis. Posterior nostril a short linear slit in front of the eye; the anterior with a very short tube near tip of snout. Teeth small, conical, sharp, uniform in size, in broad bands in mandible and on vomer, extending back on shaft of vomer in a narrow, V-shaped patch, which does not reach beyond posterior nostril. Maxillary with a narrow band or irregular double series. None of the teeth enlarged.

Length of the gill-slit two thirds the diameter of eye, and equal to or slightly less than the interspace between the two slits.

Head $2\frac{1}{3}$ to $2\frac{2}{5}$ in body, $5\frac{1}{2}$ to 6 in total; the vent nearly median.

Dorsal beginning in advance of gill-slit, the occiput midway between front of dorsal and posterior margin of pupil. Pectorals rather long, $2\frac{3}{4}$ in head.

Color light olive, with minute dusky specks. Margins of vertical fins narrowly black. Head more or less silvery on sides and below, with a distinct dusky blotch below orbit. Eye silvery below, the iris otherwise dusky.

Ophisoma prorigerum, sp. nov.

Related to *O. mystax* and *O. nitens*, differing from the former in the much smaller eye and from the latter in the much shorter tail.

Snout long and sharp, the acute soft tip protruding beyond the mandible for over two-thirds the length of orbit.

Mandibles very broad and strong; the gape decurved posteriorly, reaching to vertical from posterior margin of pupil. A conspicuous pore just behind angle of mouth. Distance from tip of snout to angle of mouth one-third distance to base of pectorals.

Teeth villiform, in broad bands, none of them enlarged. A transverse groove behind head of vomer to receive tip of mandible.

Posterior nostril slit-like, the anterior on each side of tip of snout with a short distinct thin membranous tube.

Mucous pores small, several at tip of snout, and three in upper lip, the posterior one distinct from the others and below front of pupil.

Eye small, one-half of snout, $8\frac{1}{3}$ in head, slightly less than length of gill-slit.

Head equal trunk, one third the length of tail without fin; depth one-thirteenth of total length.

Pectoral two-sevenths length of head. Dorsal beginning in advance of gill-opening, its distance from tip of snout slightly less than half distance from snout to anal.

Uniform light-brownish. Fins dusky, jet-black near tip of tail, where they have a narrow bright white margin. Mouth, gill cavity, and peritoneum black.

The type is a single specimen, 10½ inches long, taken at Station 2792, in 401 fathoms. A second small specimen was obtained at Station 2799.

Ophisoma macrurum, sp. nov.

Snout comparatively short and heavy, blunt and broadly rounded, projecting but little beyond the lower jaw; lips full.

Teeth in mandible in a broad band, those of outer series strong and obviously larger than those of inner series. Maxillary and vomerine teeth also in broad bands, none of the former enlarged, some of the anterior and middle vomerine teeth corresponding in size to the outer series in mandible. Vomerine patch divided by a transverse groove into which fits the tip of the mandible. No teeth on shaft of vomer.

Posterior nostril an elliptical slit on level of upper margin of pupil. Anterior nostril a round pore near tip of snout. Tip and lower margin of snout with five large slit-like mucous pores on each side, the last one under the posterior nostril.

Gape extending slightly beyond pupil, 2¾ in head. Eye moderate, three-fourths of snout, 6 in head, the diameter of pupil equal to width of interorbital space.

Head 1⅕ in trunk (without head), 4 in tail, the latter therefore, nearly twice the length of body. Depth one-fifteenth of total length.

Pectorals one-third of head, the fold from upper edge of gill-slit attached to its base below. Origin of dorsal slightly behind base of pectorals, its distance from tip of snout one-half that from tip of snout to front of anal.

Color dusky above, the under side of head and abdomen white, the two areas separated by a well-defined line. Fins dusky, becoming black towards tip of tail, with a well-marked whitish border. Inside of mouth, gill-cavity, and peritoneum silvery.

A single specimen, 9½ inches long, from the Gulf of California, Station 3015.

Ilyophis gen. nov. (**Ilyophidæ**.)

Body scaly. Pectorals developed. Lateral line prominent. Gill-slits horizontal, inferior, well separated. Nostrils lateral, the posterior immediately in front of eye, the anterior with a short tube, near tip of snout.

Maxillaries as in *Synaphobranchus*, the clamping processes closely appressed to the side of the vomer behind its head. Lower jaw strong, apparently with the coronoid process well developed. Series of teeth

on head and shaft of vomer continuous. No lips. Tongue little developed, with narrow, free margin. Branchiostegal rays fifteen in number (as determined without dissection), not shortened, some of them curved around and above the opercle.

Dorsal, anal, and caudal confluent, rather high, the rays clearly visible through the skin. Dorsal beginning well forward, its origin immediately behind the base of pectorals. Origin of anal near end of anterior end of body.

This eel combines the general physiognomy of *Synaphobranchus* with the separate gill-slits and long, bowed branchiostegal rays of *Simenchelys*. It may be considered provisionally the type of a family distinct from either.

(Type, *Ilyophis brunneus*, sp. nov.)

Ilyophis brunneus, sp. nov.

Body narrow, compressed throughout. Snout and jaws slender, the gape half the length of the head, and extending beyond the eye for a distance less than the diameter of the latter. Maxillary teeth small, bluntly conic, in a narrow band. Teeth on vomer large, conic, those on shaft of vomer in a single row, not continued backwards beyond middle of orbit. Teeth in mandibles in a narrow series similar to those in maxillaries, but those of the inner series enlarged and retrorse, though less than half the size of vomerine teeth.

A series of pores near margin of upper and lower jaws. Front of pupil over end of second third of length of jaw. Lower jaw strong, not flexible, the coronoid process apparently strong (not dissected out).

Gill-slits narrow, inferior, horizontal, crescent-shaped, about equal to horizontal diameter of eye; their lower (anterior) ends separated by a distance equal to their own length, their upper (posterior) ends by 1½ times that distance.

Head one-half length of trunk. Body 3¼ in total. Pectorals small, one-sixth of head, the rays evident. Scales very fine, arranged in groups at right angles to each other. Lateral line running high anteriorly, its pores white and conspicuous; the lateral line ceases before it reaches the end of the tail, which is scaleless.

Color brown; the fins, lower side of head, and branchial region darker.

A single specimen, 15 inches long, from Station 2808, 634 fathoms, (near Chatham Island, Galapagos).